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ABSTRACT

This study investigated the position of illustrations and how they affect the sequential organization of text. The primary purpose was to describe learners' reading sequence and preference for page designs with variations of illustration placement. The 70 subjects were undergraduate and graduate students enrolled in education courses at Memphis State University. Each subject was given a set of stapled pages containing eight randomly-sequenced page designs, each separated by a response sheet. For the "preferred" or natural reading sequence of the subjects to be determined, meaningless text which had the same structure and appearance as realistic text was used. The desktop publishing-generated text was printed in a two-column format for two of the designs and in a three-column format for the other six. In each design, the illustration cut across at least two columns. In addition, a two-point horizontal bar was inserted above the illustration in four of the designs. For each design subjects were asked to trace, with a pencil, the sequence with which they would naturally read the text and to indicate their reactions to the design on a five-point scale. A two-column format combined with illustrations dividing the columns was preferred over a three-column format incorporating an illustration dividing all columns. Results imply that illustration placement is a critical attribute in the design of instructional text. (5 references) (GL)

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Layout Decision Making: The Placement of Illustrations

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Layout Decision Making: The Placement of Illustrations

Introduction

A necessary process for the incorporation of illustrations in instructional text is to determine the way in which the illustration joins with the text to create a pleasing and effective page design. The effects of illustrations in instructional texts has received considerable research attention. The research suggests that illustrations not only provide interest, motivation, and attractiveness, but also aid the recall and retention of information (Levie and Lentz, 1982; Anglin, 1987).

The advent of desktop publishing has affected instructional text design. It is now easy for designers to manipulate illustrations and text; illustrations can be positioned anywhere on a page with the text "flowing around them." Consequently, many page designs confuse the sequential organization of the text. What is thought to be an obvious organizational text pattern, may require learners to examine words in an attempt to determine where they are to read next. For example, what happens when the normal horizontal or vertical flow is disrupted by a picture or graphic? This type of positioning of illustrations in relation to the text has received little research attention (Hartley, 1987). Yet it seems possible that reading speed is slowed and the thought process disrupted if the reader must stop and search for the remainder of a sentence or the next paragraph.

Designers need to consider how the illustrations join with the text so that the overall page is pleasing and effective for the learner. The design elements should be manipulated so that information in the text is presented in an organized and consistent manner. For the most part, written text is sequenced in a left-to-right, top-down direction. Therefore, horizontal arrangements will tend to be perceived in a left-to-right sequence, and vertical arrangements in a top-down sequence (Hartley, 1987).

This study investigates the positioning of illustrations and how they affect the sequential organization of the text. The primary purpose of the study is to describe learners'

reading sequence and preference for page designs with variations of illustration placement.

Method

Subjects and Design

The 70 subjects were undergraduate and graduate students enrolled in education courses at Memphis State University. A within-subjects design was used, with subjects responding to each page design.

Materials

The eight one-page "articles" used in the study were designed with desktop publishing software and printed with a laser printer to approximate a published page. For the preferred or "natural" reading sequence of the subjects to be determined, meaningless text which had the same structure and appearance as realistic text (Shannon and Weaver, 1964; Ross and Morrison, 1989) was used. The text was printed in a two-column format for two of the designs and in a three-column format for the other six. In each design, the illustration "cuts" across at least two columns (see Figure 1). Another variable, a two-point horizontal bar, was inserted above the illustration in four of the designs. Each individual page design is described below.

1. Page design #1: Two column format with the illustration centered; the illustration breaks both columns, dividing the page in half.
2. Page design #2: Identical to design #1 with a 2-point horizontal rule inserted above the illustration.
3. Page design #3: Three column format with the illustration centered; the illustration breaks all three columns, dividing the page in half.
4. Page design #4: Identical to design #3 with a 2-point horizontal rule inserted above the illustration.
5. Page design #5: Three column format with the illustration centered; the illustration breaks the left and middle columns.
6. Page design #6: Identical to design #5 with a 2-point horizontal rule inserted above the illustration.

7. Page design #7: Three column format with the illustration centered; the illustration breaks the middle and right columns.

8. Page design #8: Identical to design #7 with a 2-point horizontal rule inserted above the illustration.

A 10-item survey was also developed. Demographic items consisted of statements concerning student classification, sex, GPA, age and major. Additional items consisted of statements about reading speed, comprehension, subject's primary reading source, and whether or not the subject likes to read.

Procedure

Subjects were tested in a group. Each subject was given a set of stapled pages containing the randomly sequenced page designs. Each design was separated by a response sheet. For each design subjects were asked to trace the sequence with which they would naturally read the text with a pencil. After tracing their preferred reading format, subjects indicated their preference for the design on a 5-point Likert scale with 5 representing the most positive reaction. Subjects were instructed not to look back at any previous design. After responding to all eight designs, the subjects completed the 10-item survey.

Results

The analysis of subjects' reading paths identified three patterns of reading sequence. The most frequently identified pattern was a top-down, left-to-right reading sequence (see Table 1). The pictures made no significant difference to these subjects. Regardless of picture placement, the subjects continued to read the columned text in a top-down fashion. The second most common pattern was a left-to-right, top-down sequence. The illustration served as a text boundary causing the subjects to read the blocks of text above the illustration and then the text below the illustration. Another sequence which was identified by a small percentage of subjects with page design #6 was a left-to-right, top-down, left-to-right pattern. The subjects read around the

illustration as if the material under it had been blocked off as descriptive information.

Most subjects utilized a consistent path sequence regardless of picture placement or rule insertion. However, the percentages indicate that the placement of rules did guide some of the subjects' reading patterns. Many subjects showed a different reading pattern for page designs which were identical except for the insertion of a rule. Twenty-one percent of the subjects who responded to page design #1 with a top-down, left-to-right reading sequence changed their reading sequence with design #2 to a left-to-right, top-down sequence. Likewise, 26 percent responded differently to designs #3 and #4; 18 percent to designs #5 and #6; and 14 percent to designs #7 and #8.

The analysis of subjects' preference for page designs indicate that a preference for two column material over three column material exists. The least preferred page designs were #3 and #4 where the illustration cut across all three columns.

Discussion

The results of this study imply that illustration placement is a critical attribute to be considered in the design of instructional text. The study suggests that a two-column format combined with illustrations dividing all columns is preferred over a three-column format incorporating an illustration dividing all columns. It would appear that larger blocks of text support the top-down, left-to-right reading pattern, and are more pleasing to the reader. However, more than half of the subjects were neutral or negative about all eight page designs. This result suggests that readers do not particularly like designs where illustrations are positioned in the middle of the text. Designs where illustrations are positioned above or below the text were not incorporated into this study because these combinations do not affect the sequential organization of the text. The neutral and negative responses may have been a result of the page design or the nonsense text.

In addition, the findings of the study suggest that designs which do not have a rule are preferred over those which do. Most subjects' natural reading sequence was a top-

down, left-to-right approach; the insertion of a rule changed this approach, which may account for the negative reaction to the design. The results suggest that page designs which support the top-down, left-to-right reading pattern are preferred over those which disrupt this pattern.

Future research should investigate several questions raised by this study. One question of interest is whether an additional study utilizing "real" text with various picture placement would produce the same preference results as the present study (Ross and Morrison, 1989). Another question of interest is whether layout preference varies among poor, average, and advanced readers. Research on reading speed and visual tracking imply that there may be physiological support for certain kinds of text organization and placement of illustration combinations. An extension of the existing study should examine the effects of unfamiliar page designs on the reading strategies of subjects. It is predicted that students must adapt and create new strategies when presented unfamiliar page designs, which may result in increased reading time and loss of interest.

Results of this study provide instructional designers with new information on page design. Regardless of the page design, the most common natural reading pattern is a top-down, left-to-right sequence. In order to avoid negative reactions, decreased reading rate, and disrupted thought processes, designers must design pages which do not interfere with this natural reading behavior of learners.

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Table 1

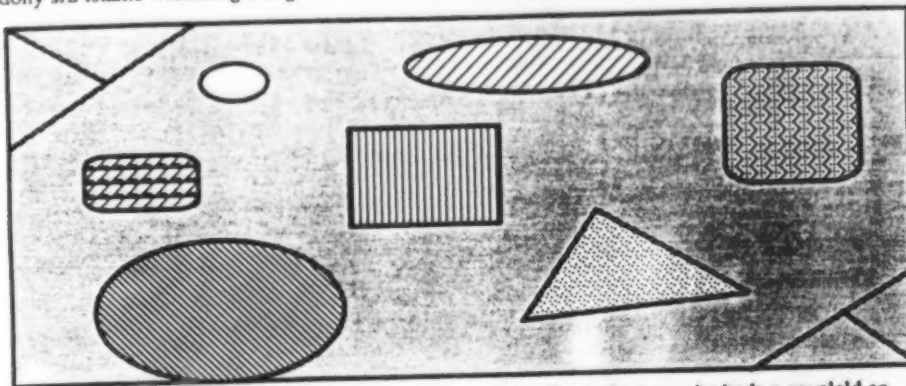
Percentages of Respondents' Reading Sequences by Page
Design

	Pattern		
	Top-down, left-to-right	Left-to-right, top-down	Top-down, left-to-right top-down
Design #1	91%	9%	0%
Design #2	79%	30%	0%
Design #3	91%	9%	0%
Design #4	65%	35%	0%
Design #5	99%	1%	0%
Design #6	81%	16%	3%
Design #7	97%	3%	0%
Design #8	83%	17%	0%

Figure 1.
Sample Page Design.

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